



CHRISTOPHER P. ECKERSLEY, Ph.D.
STAFF CONSULTANT

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Dr. Christopher Eckersley is a biomedical and mechanical engineer at ESi with related expertise in traumatic brain injury, injury analysis, neck injury, and the evaluation of use and non-use of personal safety equipment. His projects span a range of areas, including motor vehicle accidents, slip-and-falls, pediatric injuries, and product liability claims. He also has specialized expertise in blast injuries and blast biomechanics, and has analyzed blast injuries in both military and civilian environments.

Prior to joining ESi, Dr. Eckersley earned a Ph.D. in Biomedical Engineering from Duke University where he worked in the Injury Biomechanics Laboratory. For his dissertation research, Dr. Eckersley investigated traumatic brain injuries in both blunt impact and blast environments. He has also conducted extensive research into areas such as cervical spine injury due to head supported mass, personal protective equipment effectiveness in blunt impact and blast loading environments, and environmental influences on blunt impact head kinematics.

Dr. Eckersley has presented his engineering research at international conferences, and is published in peer-reviewed journals, including the *Journal of Biomechanical Engineering* and the *Journal of Science and Medicine in Sport*.

Areas of Specialization

Impact Biomechanics	Cervical Spine Injury	Computational Modeling
Blast Biomechanics	Injury Causation	Biomedical Instrumentation
Head Impact and Injury	Personal Safety Equipment	Injury Tolerance
Traumatic Brain Injury	Experimental Testing	Recreational Products
Concussion	Statistical Analysis	Sports and Exercise Equipment

Education

Ph.D., Biomedical Engineering, Duke University, 2021
M.S., Biomedical Engineering, Duke University, 2018
B.S.E., Biomedical and Mechanical Engineering, Duke University, 2016

Positions Held

Engineering Systems Inc., Charlotte, North Carolina
Staff Consultant, 2021 – Present

Duke University, Durham, North Carolina

Graduate Research Engineer, Injury Biomechanics Laboratory, 2016 – 2021
Technical Mentor, Pratt School of Engineering, 2019 – 2021
Teaching Assistant, Department of Biomedical Engineering, 2016 – 2018
Masters Student Advisor, Department of Biomedical Engineering, 2018 – 2019
Undergraduate Research Engineer, Materials Laboratory, 2016
Undergraduate Research Assistant, Injury Biomechanics Laboratory, 2014 – 2016

Zimmer-Biomet Orthopedics, Warsaw, Indiana
Post Market Engineering Intern, 2014

Professional Affiliations

Biomedical Engineering Society (BMES), Member
American Society of Mechanical Engineers (ASME), Member
Sports Health, Reviewer
PloS One, Reviewer

Honors and Awards

James H. McElhaney Fellowship in Biomedical Engineering
Tau Beta Pi Honor Society
Pi Tau Sigma Honor Society
Graduation with Departmental Distinction, Duke University
National Football League Engineering Symposium Student Grant – 2016 and 2019
Helmholtz Award for best undergraduate senior research thesis as designated by Duke University
Biomedical Engineering faculty

Publications/Presentations

Journal Publications

1. **Eckersley CP**, Op't Eynde J, Abrams MZ, Bass CR. Using Wavelet Analysis to Distinguish Cavitation Acoustic Emissions from Bunt Impact Noise. *Journal of Biomechanical Engineering*, 2021.
2. Op't Eynde J, Yu AW, **Eckersley CP**, Bass CR. Primary Blast Wave Protection in Combat Helmet Design: A Historical Comparison Between Present Day and World War I. *PLOS One*, 2020 Vol. 15(2).
3. **Eckersley CP**, Nightingale RW, Luck JF, Bass CR. The Role of Cervical Muscles in Mitigating Concussion. *Journal of Science and Medicine in Sport*, 2019 Vol. 22(6).
4. **Eckersley CP**, White TR, Cutcliffe HC, Shridharani JK, Wood GW, Bass CR. Comparing Foul Tip Impact Attenuation of Baseball Catcher Masks Using Head Impact Metrics. *PLOS One*, 2018 Vol. 13(6).

Refereed Conference Publications

1. **Eckersley CP**, Op't Eynde J, Abrams MZ, Yu AW, Li M, Yao J, Bass CR. Acoustic Detection of Blunt Induced Cavitation in the Head. *International Research Council on Biomechanics of Injury Proceedings 2020*.
2. Op't Eynde J, **Eckersley CP**, Salzar RS, Stemper BD, Shender BS, Bentley TB, Bass CR. Behind Armor Blunt Trauma (BABT) Indentor Simulating High-Velocity Impacts from Rifle Rounds on Hard Body Armor. *Personal Armour Systems Symposium 2020 Proceedings*.
3. Op't Eynde J, **Eckersley CP**, Bass CR. High-Rate Viscoelastic Shear Model of Porcine Skin, Lung and Liver Tissue. *International Research Council on Biomechanics of Injury Proceedings 2019*.
4. **Eckersley CP**, Cox CA, Ortiz-Paparoni MA, Lutz RH, Sell TC, Bass CR. A Real Pain in the Neck: Design Limits on Magnitude and Location of Head Supported Mass. *Personal Armour Systems Symposium 2018 Proceedings*.

5. Cox CA, Ortiz-Paparoni MA, Schmidt AL, Shridharani Jk, Salzar RS, **Eckersley CP**, Bass CR. Men and Women and Helmets and Necks. *Personal Armour Systems Symposium 2018 Proceedings*.
6. Op't Eynde J, Yu AW, **Eckersley CP**, Bass CR. The Lessons of History: Helmets and Primary Blast. *Personal Armour Systems Symposium 2018 Proceedings*.
7. **Eckersley CP**, Nightingale RW, Luck JF, Bass CR. Effect of Neck Musculature on Head Kinematic Response Following Blunt Impact. *International Research Council on Biomechanics of Injury Proceedings*, 2017.

Conference Presentations and Abstracts

1. Rubango K, Nightingale RW, **Eckersley CP**, Luck JF. (2018) The Effect of Thickness and Continuity of Motorcycle Helmet Shells on Performance. *8th World Congress of Biomechanics*, Dublin, Ireland.
2. Lutz RH, **Eckersley CP**, Sell TC, Bass CR. (2018) The Role of Head Supported Mass in Cervical Spine Kinematics. *American Medical Society for Sports Medicine Annual Meeting*, Orlando, FL.
3. Cox CA, Ortiz-Paparoni MA, Schmidt AL, Shridharani Jk, Salzar RS, **Eckersley CP**, Bass CR. (2018) Men and Women and Helmets and Necks. *Personal Armour Systems Symposium*, Washington, D.C.
4. Op't Eynde J, Yu AW, **Eckersley CP**, Bass CR. (2018) The Lessons of History: Helmets and Primary Blast. *Personal Armour Systems Symposium*, Washington D.C.
5. Op't Eynde J, Yu AW, **Eckersley CP**, Bass CR. (2018) Blast Wave Protection in Combat Helmet Design: A Historical Perspective. *Injury Biomechanics Symposium*, Columbus, OH.
6. **Eckersley CP**, Nightingale RW, Luck JF, Bass CR. (2018) The Role of Cervical Muscle Strength and Activation in Concussion Mitigation. *8th World Congress of Biomechanics*, Dublin, Ireland.
7. **Eckersley CP**, Cox CA, Ortiz-Paparoni MA, Lutz RH, Sell TC, Bass CR. (2018) A Real Pain in the Neck: Design Limits on Magnitude and Location of Head Supported Mass. *Personal Armour Systems Symposium*, Washington D.C.
8. **Eckersley CP**, Lutz RH, Sell TC, Cox CA, Bass CR. (2018) A Pain in the Neck: A Modeling Analysis for Design Limitations of Head Supported Mass. *Injury Biomechanics Symposium*, Columbus, OH.
9. **Eckersley CP**, Nightingale RW, Luck JF, Bass CR. (2017) Effect of Neck Musculature on Head Kinematic Response Following Blunt Impact. *International Research Council on Biomechanics of Injury*, Antwerp, Belgium.
10. O'Connell DJ, Luck JF, Gade A, Lake IV, Cutcliffe HC, Shah KP, Ginalis EE, Lambert CM, **Eckersley CP**, Yu AW, Kait JR, Christian N, Bass CR. (2017) Age Related Differences on a Smooth Pursuit Task in High School and Youth Football Participants – Implications for Baseline Concussion Assessments. *Human Movement Science Symposium*, Chapel Hill, NC.
11. Cocks FH, Simmons WN, Tan TY, **Eckersley CP**, Lim ET, Rosenberg DT, Sobb KM. (2016) α -Rhombohedral Boron Based Solid State Neutron Detector. *Domestic Nuclear Detection Office Academic Research Initiative Annual Meeting*, Atlanta, GA.
12. **Eckersley CP**, White TR, Cutcliffe HC, Shridharani JK, Bass CR. (2016) Foul Tip Impact Attenuation of Baseball Catcher Masks Using Head Impact Metrics. *American Society of Mechanical Engineers Summer Biomechanics, Bioengineering, and Bio-transport Conference*, National Harbor, MD.

13. **Eckersley CP**, White TR, Cutcliffe HC, Shridharani JK, Bass CR. (2016) Foul Tip Attenuation of Baseball Catcher Masks. *Human Movement Science Symposium*, Chapel Hill, NC.
14. **Eckersley CP**, White TR, Cutcliffe HC, Shridharani JK, Bass CR. (2015) Foul Tip Impact Attenuation Analysis of Varying Catcher Masks Using Head Impact Metrics. *National Biomedical Engineering Society Conference*, Tampa Bay, FL.